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PLACE: Dobbs Building, Raleigh, North Carolina

DATE: Wednesday, June 13, 2001

DOCKET NO.: P-100, Sub 133K

TIME IN SESSION: 9:00 A.M. TO 12:30 P.M.

BEFORE: Commissioner Lorinzo L. Joyner, Presiding
Chair Jo Anne Sanford
Commissioner Robert V. Owens, Jr.

IN THE MATTER OF:
Generic Proceeding

Performance Measurements and Enforcement Mechanisms

Volume 3

A P P E A R A N C E S:

FOR BELLSOUTH TELECOMMUNICATIONS, INC.:

Edward L. Rankin, III, General Counsel
BellSouth Telecommunications, Inc.
Post Office Box 30188
Charlotte, North Carolina 28230

R. Douglas Lackey, Attorney at Law
J. Phillip Carver, Attorney at Law
BellSouth Telecommunications, Inc.
675 West Peachtree Street, N.E., Suite 4300
Atlanta, Georgia 30375

Robert W. Kaylor
Law Offices of Robert W. Kaylor, P.A.
225 Hillsborough Street, Suite 480
Raleigh, North Carolina 27603

NORTH CAROLINA UTILITIES COMMISSION

1 APPEARANCES CONTINUED:

2 FOR AT&T COMMUNICATIONS OF THE SOUTHERN STATES, INC.:

3 Timothy G. Barber, Attorney at Law
4 Womble, Carlyle, Sandridge and Rice
3300 One First Union Center
5 Charlotte, North Carolina 28202

6 Bill Prescott, Attorney at Law
1200 Peachtree, NW
7 Atlanta, Georgia 30309

8 Burley B. Mitchell, Jr., Attorney at Law
Womble, Carlyle, Sandridge and Rice
150 Fayetteville Street Mall, Suite 2100
9 Raleigh, North Carolina 27602

10 FOR WORLDCOM, INC.:

11 Ralph McDonald
Bailey & Dixon, L.L.P.
12 P.O. Box 1351
Raleigh, North Carolina 27602-1351

13 Dulaney L. O'Roark, III, Attorney at Law
14 WorldCom, Inc.
Concourse Corporate Center Six
15 6 Concourse Parkway
Atlanta, Georgia 30328

16 FOR ACCESS INTEGRATED NETWORK, BIRCH TELECOM, COVAD
17 COMMUNICATIONS, AND MPOWER COMMUNICATIONS:

18 John A. Doyle, Jr.
Parker, Poe, Adams and Bernstein, L.L.P.
19 150 Fayetteville Street Mall, Suite 1400
Post Office Box 389
20 Raleigh, North Carolina 27602

21 FOR COVAD COMMUNICATIONS:

22 Catherine F. Boone, Attorney at Law
Covad Communications
23 10 Glenlake Parkway, Suite 130
Atlanta, Georgia 30328

24

NORTH CAROLINA UTILITIES COMMISSION

1 APPEARANCES CONTINUED:

2 FOR TIME WARNER COMMUNICATIONS OF NORTH CAROLINA,
3 THE NORTH CAROLINA CABLE TELECOMMUNICATIONS
4 ASSOCIATION:

5 Marcus Trathen
6 Brooks, Pierce, McLendon, Humphrey and Leonard,
7 L.L.P.
8 Post Office Box 1800
9 Raleigh, North Carolina 27602

10 FOR THE USING AND CONSUMING PUBLIC:

11 Paul L. Lassiter, Staff Attorney
12 Public Staff - N.C. Utilities Commission
13 Post Office Box 29520
14 Raleigh, North Carolina 27626-0520

15 Kevin Anderson, Assistant Attorney General
16 N.C. Department of Justice
17 P. O. Box 629
18 Raleigh, North Carolina 27602

19

20

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1 else, we are ready to begin.

2 BellSouth, your next witness?

3 MR. LACKEY: Madam Chairman, BellSouth calls
4 Doctor Mulrow. We're going to launch into the exciting
5 part of this hearing now.

6 COMMISSIONER JOYNER: It's early in the
7 morning Mr. Lackey.

8 MR. LACKEY: Well, we've called a statistician
9 so it will be -- it will be interesting.

10

11 EDWARD J. MULROW, Ph.D; Being first duly sworn,
12 testified as follows:

13

14 DIRECT EXAMINATION BY MR. LACKEY:

15 Q. (MR. LACKEY) Would you state your name and address
16 for the record, please?

17 A. Edward Mulrow, 1225 Connecticut Avenue, North West,
18 Washington, D.C.

19 Q. And by whom are you employed?

20 A. Ernst and Young, L.L.P.

21 Q. And you are, in fact, a statistician?

22 A. Yes, I am.

23 Q Did you cause to be prefiled in this proceeding
24 eighteen (18) pages of direct testimony in question and

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1 answer form?

2 A. Yes, I did.

3 Q. Do you have any changes or corrections to that
4 direct testimony?

5 A. No, I don't.

6 Q. Did you also cause to be filed eighteen (18) pages
7 of rebuttal in question and answer form?

8 A. Yes.

9 Q. Do you have any changes or corrections to the
10 rebuttal testimony?

11 A. No, I don't.

12 Q. Accompanying your direct testimony were there two
13 exhibits?

14 A. Yes.

15 Q. Do you have any changes or corrections to the two
16 exhibits?

17 A. No, I don't.

18 MR. LACKEY: Madam Chair, continuing with what
19 we did yesterday, should we mark the two exhibits as
20 BellSouth's composite exhibit three.

21 COMMISSIONER JOYNER: Yes, they will be marked
22 -- that exhibit will be marked as BellSouth composite
23 exhibit three.

24 MR. LACKEY: Thank you.

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1 BELLSOUTH EJM COMPOSITE EXHIBIT 3

2 (Identified)

3 Q. (MR. LACKEY) If I were to ask you the same
4 questions that appear in your direct and rebuttal
5 testimony today, would your answers be the same?

6 A. Yes, they would.

7 MR. LACKEY: Madam Chair I'd like to have
8 Doctor Mulrow's direct and rebuttal testimony included
9 in the record, please.

10 CHAIRMAN JOYNER: That's allowed.

11
12 (REPORTER'S NOTE: The prefiled direct testimony
13 filed on April 23, 2001 and rebuttal testimony filed on
14 May 21, 2001, of EDWARD J. MULROW, Ph.D., will be
15 reproduced in the record at this point the same as if
16 the questions had been orally asked and the answers
17 orally given from the witness stand.)

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1 Q. (MR. LACKEY) Do you have a brief summary of your
2 testimony?

3 A. Yes, I do.

4 Q. Would you please give it?

5 A. Good morning. My name is Edward Mulrow, and I'm a
6 statistician employed by Ernst and Young. My purpose of
7 appearing in this proceeding is to address the
8 appropriate methodology for determining whether
9 BellSouth is providing parity to the CLPs in North
10 Carolina, both individually and as a whole.

11 My basic position is that when we are
12 comparing the service that BellSouth provides to the
13 CLPs, with similar service that BellSouth provides to
14 itself, the appropriate statistical test to use is
15 called the Truncated Z.

16 More specifically, I'm actually recommending a
17 methodology that is called the Truncated Z with Error
18 Probability Balancing. This methodology serves to
19 detect statistically different results in the service
20 BellSouth provides to itself and the CLPs while
21 balancing the probability that an error will be made in
22 the analysis.

23 In statistics, there are two types of errors
24 that can be made. Type up -- Type I errors, where

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1 BellSouth is providing parity, but the test suggests it
2 is not, and Type II errors where BellSouth is not
3 providing parity, but the test suggests it is. The
4 error probability balancing means that there is just as
5 much chance of one type of error being made as the
6 other, so neither side is disadvantaged.

7 The Truncated Z statistic has been termed an
8 aggregate statistic because it is used to make a global
9 judgment on parity by looking across a set of
10 like-to-like comparison results. It is a credible and
11 practical methodology, which even AT&T witness, Doctor
12 Robert Bell, agrees is appropriate provided that the
13 penalty plan allows for a reasonable and appropriate
14 level of aggregation. In fact, there is very little
15 disagreement between Doctor Bell and myself concerning
16 statistical methodology. The disagreements between
17 BellSouth and the CLPs that are related to statistics
18 lie in the important decisions that need to be made in
19 order to carry out the statistical tests. One area of
20 disagreement is the appropriate level of disaggregation.

21 The other area of disagreement is related to
22 the balancing methodology. Specifically, a measure of a
23 meaningful difference between the BellSouth and CLP
24 performance, which we refer to as "delta" needs to be

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1 chosen. It is necessary to serve as a reference level
2 of disparity so that the probability of a Type II error
3 can be calculated.

4 In the Louisiana "Statistician's Report," we
5 recommended that the choice of delta be left to
6 telephony experts. I believe this is also true for the
7 chose -- for the choice of an appropriate aggregation
8 level. This does not mean that statisticians do not
9 have any role to play in choosing these important
10 factors. Indeed statistical science is important in
11 evaluating the impact of different choices of an
12 aggregat- -- aggregation level or "delta."

13 With respect to delta, one such impact is that
14 if the observed difference between the BellSouth average
15 performance and the CLP performance is greater than
16 one-half delta standard deviations, then BellSouth will
17 be found to be out of compliance and pay a penalty.
18 This is true regardless of the sample sizes used in the
19 test, which is quite different than the textbook
20 situation where a fixed critical value for the Z
21 statistic is used. In that case, the failure threshold
22 for the CLP sample average is large for small sample
23 sizes, and very small for large sample sizes. While
24 that is an appropriate approach for studies that fit

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1 into textbook mode, the situation we are dealing with is
2 not a textbook situation.

3 We do not have planned samples. Instead,
4 customers choose themselves into the sample when they
5 request a service call. We are also constrained by
6 timely reporting requirements. We want a calculation
7 system that is self-effectuating in that it requires
8 little to no manual intervention, and we want the
9 analysis done within a short amount of the time.
10 Finally, we want a system that will give BellSouth an
11 incentive to provide a CLP with the opportunity to
12 compete.

13 In summary, I recommend the use of the
14 Truncated Z methodology with error probability balancing
15 in situations where transaction level data is available
16 and a BellSouth retail analogue exists, as described in
17 the joint "statistician's report" attached to my direct
18 testimony. This method is based on the extensive
19 examination of BellSouth performance measure data, and
20 is therefore both credible and practical. In order to
21 use the methodology, the Commission needs to choose the
22 appropriate aggregation level as well as the parameter
23 of the balancing alternative hypothesis, namely "delta."
24 These choices should be based on the business arguments

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1 that the parties make to The Commission.

2 That concludes my summary.

3 MR. LACKEY: Doctor Mulrow is available.

4 COMMISSIONER JOYNER: Thank you. I believe

5 AT&T.

6 CROSS-EXAMINATION BY MR. PRESCOTT:

7 Q. Good morning, Doctor Marlow.

8 A. Good morning.

9 Q. Mulrow; I'm sorry.

10 Would you agree that in making statistical
11 comparisons, to the extent possible, the data should be
12 broken down to allow for like-to-like comparisons?

13 A. Yes, I do.

14 Q. And would you also agree that including dissimilar
15 products in the same cell can mask discrimination?

16 A. Yes, it could mask discrimination, and on the
17 opposite side it could make it look like there is
18 discrimination.

19 Q. Okay. Did you participate in BellSouth's
20 determination of the aggregation they propose in the
21 SEEM?

22 A. No, I did not.

23 Q. So, you don't know whether it's appropriate or not?

24 A The aggregation level?

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1 Q. Yes.

2 A. No, I do not.

3 Q. Okay. And if I understand your summary correctly,
4 you also support the use of the balancing critical value
5 methodology?

6 A. Yes, I do.

7 Q. And what is the purpose of that methodology?

8 A. The purpose -- I'd say there are several purposes.
9 First the -- just the idea that the two error
10 probabilities are balanced, when sample sizes are small,
11 the probability of a Type II error, when you use a fixed
12 critical value tends to be high. Of course, you have to
13 define what you mean by where that Type II error is
14 measured.

15 And on the opposite side, when sample sizes
16 get very large, you tend to find statistically
17 significant differences in performance that are -- would
18 more than likely be deemed in a practical sense to not
19 be very important. This is usually highlighted in many
20 statistical textbooks, that people should be careful of
21 that problem.

22 Q. And the primary purpose is to -- to balance Type I
23 and Type II errors, is that correct?

24 A. I'd say that at least from the Ernst and Young

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1 point of view, our primary purpose was to take a look at
2 the sample size issue. It just turned out that
3 balancing was a way of getting at it.

4 Q. In your direct testimony, you listed four key
5 principles, and one of those principles was that the
6 testing methodology should balance Type I and Type II
7 probabilities, is that correct?

8 A. That's correct.

9 Q. In using the balancing methodology, isn't it true
10 that some level of disparity in service is allowed to
11 exist between the level of service BellSouth provides to
12 its own retail operations and the level of service it
13 provides to the CLPs?

14 A. Yes, when you use a balancing methodology, there
15 are certain disparity levels which potentially could go
16 undetected, yeah.

17 Q. And isn't it true that a delta value of point two
18 five (.25) would allow less disparity to exist in
19 BellSouth's performance for itself as compared to the
20 CLPs than a delta value of one?

21 A. Yes, the smaller delta is, the less disparity it
22 allows. The question really is, how much you want to
23 allow.

24 Q. And you did not recommend the delta values proposed

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1 by BellSouth, is that correct?

2 A. No, I did not.

3 Q. And delta -- and BellSouth uses the delta to define
4 the alternative hypothesis from mean measures, is that
5 correct?

6 A. That is correct, it does, yes.

7 Q. In using the delta value of one proposed by
8 BellSouth, the alternative hypo- -- hypothesis that
9 comprises part of the statistical test would incorporate
10 a difference in means of one standard deviation, isn't
11 that correct?

12 A. That's correct, yes.

13 Q. Doctor Mulrow, I think you also would agree that a
14 statis- -- statisticians can play a role in describing
15 the impact of -- of a particular delta?

16 A. Yes, I have tried to do that on occasion myself.
17 For instance, as I pointed out, whatever delta you
18 choose, penalty payments begin at the halfway point, so
19 penalty payments actually start at delta over two, not
20 delta. That's where discrimination begins to get
21 detected. That's one impact.

22 Q. Okay. On page sixteen (16) or seven- -- and
23 seventeen (17) of your direct testimony you present a
24 hypothetical example in order to assist in understanding

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1 what delta means, is that correct?

2 A. Yes, I believe so. I -- could you state those
3 pages again?

4 Q. I think it's page sixteen (16) and -- starts on
5 page sixteen (16) and carries over on to seventeen (17)?

6 A. That's the direct testimony?

7 Q. Of the direct, yes.

8 A. (Witness looks for referenced testimony and peruses
9 same.)

10 Yes. Yes, sir, I see that.

11 Q. And in your hypothetical you describe a measure, I
12 think it's time to provision a dispatch residential
13 retail order?

14 A. Yes, that's right.

15 Q. Okay. And you assume that the measure has a mean
16 of five days for BellSouth customers, is that correct?

17 A. That's correct, yes.

18 Q. And a standard deviation of five days for BellSouth
19 customers?

20 A. Yes, that's also correct.

21 Q. Now, I want you to assume that this Commission
22 judges that service to a CLEC becomes a material problem
23 with a CLEC -- when the CLEC mean for this measure reach
24 six point two five (6.25) days.

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1 A. Okay, I will assume that.

2 Q. Okay. And this would correspond to the CLEC case
3 as taking twenty-five percent (25%) more time to
4 provision on average than BellSouth, is that correct?

5 A. Could you state that again; I'm sorry?

6 Q. This would -- the -- this would correspond to the
7 CLEC case as taking twenty-five percent (25%) more time
8 to provision on average than BellSouth takes for its own
9 customers?

10 A. Yes.

11 Q. Okay.

12 A. One fourth longer, yes.

13 Q. Right, okay.

14 Based on this assumption, about what
15 constitutes a material difference?

16 What value of delta would be appropriate for
17 this measure?

18 A. If you're saying that they --

19 Q. (Interposing) Six point two five (6.25) is -- days
20 is determined to be material.

21 A. If that is determined to be material --?

22 Q. Right, what is the appropriate delta?

23 A. Now, in terms of materiality -- well, I guess I
24 should say, I may need a little more information on what

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1 you deter- -- what your definition of materiality is.

2 Q. Ahh --

3 A. (Interposing) Other than just that range, what --
4 what consequences --?

5 Q. I'm not sure -- I'm not sure I understand.

6 A. Well, as I'm getting to it, if you're saying
7 something is immaterial, should a -- a failure of the
8 test result if the disparity level is lower than that.

9 Q. Well, let me -- let me try to get at this a
10 different way.

11 On lines two through five of your -- your direct
12 testimony, in this hypothetical, --

13 A. (Interposing) Yes.

14 Q. -- you say that a delta of point five O (.50)
15 corresponds to a CLEC mean of six point two five (6.25)
16 days, is that correct?

17 A. A delta of -- could you point to the line?

18 Q. It's two -- it begins on two -- on line two, on
19 page seventeen (17), it says, "assume the exact same
20 facts as above, but use a delta of point five (.5)"?

21 A. Yes.

22 Q. And you say in that case the difference between
23 Bell- -- the BellSouth average for the month and the CLP
24 average for the same measure could only be six point two

NORTH CAROLINA UTILITIES COMMISSION

1 five (6.25) days?

2 A. Yes. In that case, -- and what I'm referring to as
3 the -- the payment -- the penalty determination
4 threshold would be six point two five (6.25) days.

5 Q. Okay. And -- but balancing would not occur at
6 point five O (.50)?

7 A. Yes, the -- the balancing occurs at a delta of
8 point five O (.50). The -- the determination of -- of
9 disparity happens at one quarter of the standard
10 deviation, half of that, which is the six point two five
11 (6.25) days.

12 Q. All right. And so there is no balancing of Type I
13 and Type II errors at point five O (.50), is there?

14 A. Yes, it's -- they are balanced at that point, yes.
15 Penalties are paid at one -- at half of that. The
16 balancing is -- the point five (.5) is a reference point
17 for balancing. The Type I and Type II errors are
18 balanced there. The determination of when you pay a
19 penalty occurs at the midway point.

20 Q. Okay. In -- in implementing the Truncated Z, if
21 the aggregation is -- is in- -- inappropriate, if
22 dissimilar things are aggregated together -- let me
23 rephrase that.

24 If dissimilar things are aggregated, is it

NORTH CAROLINA UTILITIES COMMISSION

- 1 possible that the implementation of the Truncated Z
2 would be wrong?
- 3 A. I'm not sure what you mean by "dissimilar things."
4 Q. If -- if dissimilar -- if BellSouth aggregates
5 products that have different intervals in the same cell?
6 A. The Truncated Z is somewhat agnostic to that,
7 because you do your like-to-like comparisons, you come
8 up with Z scores, so we work very hard to get them all
9 to Z scores which makes all those things -- which puts
10 the comparisons in each like-to-like class on the same
11 scale, so you can compare those things.
- 12 Q. Okay.
13 A. The question that -- the problem comes in is that
14 the cell results lose their identity. So the Truncated
15 Z still calculates a proper Z statistic. What you've
16 lost is the identity of each individual cell when you do
17 that.
- 18 Q. Okay. So, the comparisons have to be a
19 like-to-like things?
20 A. The cell level comparisons are like-to-like, yes.
21 Q. They should be like-to-like?
22 A. They -- as best that we can determine they should
23 be like-to-like.
24 Q. Okay.

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1 MR. PRESCOTT: That's all I have for Doctor
2 Mulrow.

3 COMMISSIONER JOYNER: Thank you.
4 Attorney General?

5 MR. ANDERSON: No questions.

6 COMMISSIONER JOYNER: Public Staff?

7 MR. LASSITER: Just a couple.

8 FURTHER CROSS-EXAMINATION BY MR. LASSITER:

9 Q. (MR. LASSITER) Doctor Mulrow, do you agree that
10 incorporating the balancing critical value technique and
11 its value means that in order to detect noncompliance
12 any observed disparity must not only be greater than
13 would occur by random choice but also be large enough to
14 threaten a CLPs opportunity to compete?

15 A. Yes.

16 Q. Do increases in the delta value always lead to
17 critical -- smaller critical values?

18 A. I'm sorry, could you state that again?

19 Q. Do increases in delta value always increase --
20 always lead to smaller critical values?

21 A. No, just the opposite is true.

22 Q. Okay. Did you testify in the Florida Performance
23 Measurement Proceeding?

24 A. Yes, I did.

NORTH CAROLINA UTILITIES COMMISSION

1 Q. Are you aware that the staff proposed a delta value
2 of point five (.5) for Tier 1, and zero point three
3 three (0.33) for Tier 2?

4 A. Yes, I am aware of that.

5 MR. LASSITER: Thank you.

6 COMMISSIONER JOYNER: My records reflect that
7 there are no additional --

8 MR. PRESCOTT: Correct.

9 COMMISSIONER JOYNER: -- cross --

10 MR. PRESCOTT: Right.

11 COMMISSIONER JOYNER: -- from the parties.

12 There is no additional cross form the parties.

13 Redirect from BellSouth.

14 MR. LACKEY: Just a couple, if I may, Madam
15 Chair.

16 REDIRECT EXAMINATION BY MR. LACKEY:

17 Q. Doctor Mulrow, just to be clear about this, if the
18 Florida Commission Staff recommended a delta of point
19 five (.5), at what level of delta will BellSouth start
20 paying penalties if that delta point five (.5) is
21 accepted?

22 A. At point two five (.25), the one quarter (1/4)
23 standard deviation.

24 Q. And if the delta recommended by the CLPs in this

NORTH CAROLINA UTILITIES COMMISSION

1 case of point two five (.25) is accepted, at what point
2 will BellSouth start paying penalties under this plan?
3 A. Half of that, so that would be the one eighth (1/8)
4 standard deviation, or a point one twenty-five (.125)
5 delta.

6 MR. LACKEY: That's all I have.

7 Thank you, Madam Chair.

8 Like to move the admission of BellSouth
9 composite exhibit three.

10 COMMISSIONER JOYNER: That's allowed.

11 MR. LACKEY: I'm sorry, y'all may have
12 questions. I jumped the gun.

13 COMMISSIONER JOYNER: Commissioner Owens?
14 (No response.)

15 COMMISSIONER JOYNER: You were intuitive.
16 BellSouth composite exhibit three --

17 MR. LACKEY: (Interposing) Yes, ma'am.

18 COMMISSIONER JOYNER: -- is admitted into
19 evidence.

20 MR. LACKEY: Thank you, ma'am.

21 May the witness be excused.

22 COMMISSIONER JOYNER: You're excused, Mr.
23 Mulrow.

24 THE WITNESS: Thank you.

NORTH CAROLINA UTILITIES COMMISSION

1 (WITNESS EXCUSED.)

2 MR. CARVER: Thank you. BellSouth calls Ron
3 Pate.

4 COMMISSIONER JOYNER: Good morning, Mr. Pate.

5
6 RONALD M. PATE; Being first duly sworn,
7 testified as follows:

8
9 DIRECT EXAMINATION BY MR. CARVER:

10 Q. (MR. CARVER) Mr. Pate, would you please state your
11 full name and your business address?

12 A. My name is Ronald M. Pate. The business address is
13 675 West Peachtree, Atlanta, Georgia.

14 Q. And by whom are you employed and in what capacity?

15 A. I'm employed by BellSouth Telecommunications as a
16 Director in Interconnection Services.

17 Q. And have you caused to be prefiled in this case
18 eighteen (18) pages of rebuttal testimony?

19 A. Yes, I have.

20 Q. And there are four exhibits attached to that
21 testimony?

22 A. Yes, that's correct.

23 Q. Do you have any changes to make to either your
24 testimony or your exhibits?

NORTH CAROLINA UTILITIES COMMISSION